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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,970	03/30/2004	Nicholas Kottenstette	56231-443 (MKS-138)	8649

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EXAMINER	
CHERRY, STEPHEN J	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

H.A

Office Action Summary	Application No.	Applicant(s)
	10/814,970	KOTTENSTETTE ET AL.
	Examiner	Art Unit
	Stephen J. Cherry	2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,11-16,19-34 and 36* is/are rejected.

7)☒ Claim(s) *9,10,17,18 and 35* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6-18-2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 11, 24-25, 29-31 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 4,487,063 to Hopper.

Claim 1 recites, as disclosed by Hopper:

1. A flow monitoring; system comprising:

a first temperature-sensitive resistive device, thermally coupled to a first portion of a fluid transfer apparatus, for producing a first temperature-dependant voltage signal representative of the temperature of the fluid within the first portion of the fluid transfer apparatus ('063; fig. 1, 14 and 16);

a first current control device, coupled to the first temperature-sensitive resistive device, for controlling a first current signal flowing through the first temperature-sensitive resistive device ('063, fig. 1, 18);

a second temperature-sensitive resistive device, thermally coupled to a second portion of the fluid transfer apparatus, for producing a second temperature-dependant voltage signal representative of the temperature

of the fluid within the second portion of the fluid transfer apparatus ('063; fig. 1, 20 and 26);

a second current control device, coupled to the second temperature-sensitive resistive device, for controlling a second current signal flowing through the second temperature-sensitive resistive device ('063, 24); and

a monitoring circuit for monitoring the first and second temperature-dependant voltage signals and producing an output signal representative of the volume of fluid passing through the fluid transfer apparatus ('063, 28).

Claim 2 recites, as disclosed by Hopper:

2. The flow monitoring system of claim 1 wherein the first and second current signals are essentially equal ('063, col. 2, line 32).

Claim 11 recites, as disclosed by Hopper:

11. The flow monitoring system of claim 1 wherein the monitoring circuit includes an instrumentation amplifier for producing the output signal, wherein the instrumentation amplifier includes: a first input terminal for receiving the first temperature-dependant voltage signal; and a second input terminal for receiving the second temperature-dependant voltage signal ('063, fig. 1, 28).

Claim 24 recites, as disclosed by Hopper:

24. The flow monitoring system of claim 1 wherein the first and second

temperature-sensitive resistive devices are constructed of a high positive temperature coefficient resistive material ('063, 14 and 20 and fig. 2).

Claim 25 recites, as disclosed by Hopper:

25. The flow monitoring system of claim 24 wherein the high positive temperature coefficient resistive material has a temperature coefficient of approximately 4500 ppm/°C ('063, 14 and 20 and fig. 2).

Claim 29 recites, as disclosed by Hopper:

29. A flow monitoring system comprising:

a first temperature-sensitive resistive device for producing a first temperature-dependant voltage signal representative of the temperature proximate the first temperature-sensitive resistive device ('063; fig. 1, 14 and 16);

a first current control device, coupled to the first temperature-sensitive resistive device, for controlling a first current signal flowing through the first temperature-sensitive resistive device ('063, fig. 1, 18);

a second temperature-sensitive resistive device for producing a second temperature-dependant voltage signal representative of the temperature proximate the second temperature-sensitive resistive device ('063; fig. 1, 20 and 26);

a second current control device, coupled to the second temperature-sensitive resistive device, for controlling a second current signal flowing through the second temperature-sensitive resistive device

('063, 24); and a monitoring circuit for monitoring the first and second temperature-dependant voltage signals and producing an output signal representative of the difference between the temperature proximate the first temperature-sensitive resistive device and the second temperature-sensitive resistive device ('063, 28).

Claim 30 recites, as disclosed by Hopper:

30. The flow monitoring system of claim 29 wherein the first and second temperature-sensitive resistive devices are constructed of a high positive temperature coefficient resistive material ('063, 14 and 20 and fig. 2).

Claim 31 recites, as disclosed by Hopper:

31. The flow monitoring system of claim 30 wherein the high positive temperature coefficient resistive material has a temperature coefficient of approximately 4500 ppm/°C ('063, 14 and 20 and fig. 2).

Claim 36 recites, as disclosed by Hopper:

36. A flow monitoring system comprising:

a first current control device for controlling a first current signal flowing through a first temperature-sensitive resistive device, wherein the first temperature-sensitive resistive device produces a first temperature-dependant voltage signal representative of the temperature of fluid within a first portion of a fluid transfer apparatus ('063, fig. 1, 18);

a second current control device for controlling a second current signal

flowing through a second temperature-sensitive resistive device, wherein the second temperature-sensitive resistive device produces a second temperature-dependant voltage signal representative of the temperature of the fluid within a second portion of the fluid transfer apparatus ('063, fig. 1, 24); and

a monitoring circuit for monitoring the first and second temperature-dependant voltage signals and producing an output signal representative of the volume of fluid passing through the fluid transfer apparatus ('063, 28).

Claims 1-2, 11-13, 20-22 and 26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,450,024 to McCulloch.

Claim 1 recites, as disclosed by McCulloch:

1. A flow monitoring; system comprising:

a first temperature-sensitive resistive device, thermally coupled to a first portion of a fluid transfer apparatus, for producing a first temperature-dependant voltage signal representative of the temperature of the fluid within the first portion of the fluid transfer apparatus ('024; fig. 1, 16);

a first current control device, coupled to the first temperature-sensitive resistive device, for controlling a first current signal flowing through the first temperature-sensitive resistive device ('024; fig. 1, 14);

a second temperature-sensitive resistive device, thermally coupled to a second portion of the fluid transfer apparatus, for producing a second temperature-dependant voltage signal representative of the temperature of the fluid within the second portion of the fluid transfer apparatus ('024; fig. 1, 18);

a second current control device, coupled to the second temperature-sensitive resistive device, for controlling a second current signal flowing through the second temperature-sensitive resistive device ('024; fig. 1, 12); and

a monitoring circuit for monitoring the first and second temperature-dependant voltage signals and producing an output signal representative of the volume of fluid passing through the fluid transfer apparatus ('024; fig. 1, U1-U4).

Claim 11 recites, as disclosed by McCulloch:

11. The flow monitoring system of claim 1 wherein the monitoring circuit includes an instrumentation amplifier for producing the output signal, wherein the instrumentation amplifier includes: a first input terminal for receiving the first temperature-dependant voltage signal; and a second input terminal for receiving the second temperature-dependant voltage signal ('024, fig. 1, U1-U4).

Claim 12 recites, as disclosed by McCulloch:

12. The flow monitoring system of claim 11 wherein a gain factor of the

instrumentation amplifier is defined by the resistive values associated with a plurality of resistors ('024, col. 5, line 45).

Claim 13 recites, as disclosed by McCulloch:

13. The flow monitoring system of claim 12 wherein the gain factor is approximately twenty ('024, col. 5, line 45, "ten").

Claim 20 recites, as disclosed by McCulloch:

20. The flow monitoring system of claim 1 wherein the fluid is a liquid fluid ('024, col. 16, line 18).

Claim 21 recites, as disclosed by McCulloch:

21. The flow monitoring system of claim 1 wherein the fluid is a gaseous fluid ('024, col. 16, line 18).

Claim 22 recites, as disclosed by McCulloch:

22. The flow monitoring system of claim 1 wherein the transfer apparatus is a tube ('024, col. 4, line 30).

Claim 26 recites, as disclosed by McCulloch:

26. A flow monitoring, system comprising:

a first temperature-sensitive resistive device, thermally coupled to a first portion of a fluid transfer apparatus, for producing a first temperature-dependant voltage signal representative of the temperature of the fluid within the first portion of the fluid transfer apparatus ('024; fig. 1, 16);

a first current control device, coupled to the first temperature-sensitive

resistive device, for controlling a first current signal flowing through the first temperature-sensitive resistive device ('024; fig. 1, 14);

a second temperature-sensitive resistive device, thermally coupled to a second portion of the fluid transfer apparatus, for producing a second temperature-dependant voltage signal representative of the temperature of the fluid within the second portion of the fluid transfer apparatus ('024; fig. 1, 18);

a second current control device, coupled to the second temperature-sensitive resistive device, for controlling a second current signal flowing through the second temperature-sensitive resistive device ('024; fig. 1, 12); and

an instrumentation amplifier for producing an output signal representative of the volume of fluid passing through the fluid transfer apparatus ('024, fig. 1, U1-U4), wherein the instrumentation amplifier includes:

a first input terminal for receiving the first temperature-dependant voltage signal ('024, fig. 1, U1); and

a second input terminal for receiving the second temperature-dependant voltage signal ('063, fig. 1, U2).

Claim 27 recites, as disclosed by McCulloch:

27. The flow monitoring system of claim 26 wherein a gain factor of the instrumentation amplifier is defined by the resistive values associated with a plurality of resistors ('024, col. 5, line 45).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3-8, 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hooper in view of U.S. Patent 4,487,063 to Hooper in view of Horowitz and Hill, "The Art of Electronics", page 253.

The recite, as disclosed by Hooper:

> a first temperature-sensitive resistive device, thermally coupled to a first portion of a fluid transfer apparatus, for producing a first temperature-dependant voltage signal representative of the temperature of the fluid within the first portion of the fluid transfer apparatus ('063; fig. 1, 14 and 16);
>
> a first current control device, coupled to the first temperature-sensitive resistive device, for controlling a first current signal flowing through the first temperature-sensitive resistive device ('063, fig. 1, 18);
>
> a second temperature-sensitive resistive device, thermally coupled to a second portion of the fluid transfer apparatus, for producing a second temperature-dependant voltage signal representative of the temperature

of the fluid within the second portion of the fluid transfer apparatus ('063; fig. 1, 20 and 26);

a second current control device, coupled to the second temperature-sensitive resistive device, for controlling a second current signal flowing through the second temperature-sensitive resistive device ('063, 24); and

a monitoring circuit for monitoring the first and second temperature-dependant voltage signals and producing an output signal representative of the volume of fluid passing through the fluid transfer apparatus ('063, 28).

However, Hooper does not recite the details of the current control devices.

The claims further recite the use of current control devices, the details of which are disclosed by Horowitz and Hill:

the first current controlling device includes a first transistor for controlling the first current signal flowing through the first temperature-sensitive resistive

device (Horowitz and Hill, page 253 G, 2n5457, and 2n4401); and

the second current controlling device includes a second transistor for controlling the second current signal flowing through the second temperature-sensitive resistive device (Horowitz and Hill, page 253 G, 2n5457, and 2n4401).

wherein the first and second transistors are field effect transistors (Horowitz and Hill, page 253 G, 2n5457.

the first current controlling device includes a first amplification circuit coupled to the first transistor, wherein the first amplification circuit is responsive to a first control signal and provides a first control voltage to the first transistor; and the second. current controlling device includes a second amplification circuit coupled to the second transistor, wherein the second amplification circuit is responsive to a second control signal and provides a second control voltage to the second transistor (Horowitz and Hill, page 253 G, OP-97).

the first and second amplification

circuits are operational amplifiers (Horowitz and Hill, page 253 G, OP-97).

wherein the first and second control signals are the same signal (Horowitz and Hill, page 253 G, OP-97, Vin).

wherein: the first current controlling device includes a first control resistive device coupled to the first transistor, wherein the first current signal flows through the first control resistive device and generates a first feedback signal that is provided to the first amplification circuit; and the second current controlling device includes a second control resistive device coupled to the second transistor, wherein the second current signal flows through the second control resistive device and generates a second feedback signal that is provided to the second amplification circuit (Horowitz and Hill, page 253 G, voltage form R to OP-97).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the current sink of Horowitz and Hill for added precision of a closed loop implementation of a current source (see Horowitz and Hill, page 252 G, "precision current sink").

Claims 14-16, 19 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hooper in view of U.S. Patent 6,450,024 to McCulloch et al in view of Horowitz and Hill, "The Art of Electronics", page 242-245.

The claims recite, as disclosed by McCulloch:

> a first temperature-sensitive resistive device, thermally coupled to a first portion of a fluid transfer apparatus, for producing a first temperature-dependant voltage signal representative of the temperature of the fluid within the first portion of the fluid transfer apparatus ('024; fig. 1, 16);
>
> a first current control device, coupled to the first temperature-sensitive resistive device, for controlling a first current signal flowing through the first temperature-sensitive resistive device ('024; fig. 1, 14);
>
> a second temperature-sensitive resistive device, thermally coupled to a second portion of the fluid transfer apparatus, for producing a second temperature-dependant voltage signal representative of the temperature of the fluid within the second portion of the fluid transfer apparatus ('024; fig. 1, 18);

a second current control device, coupled to the second temperature-sensitive resistive device, for controlling a second current signal flowing through the second temperature-sensitive resistive device ('024; fig. 1, 12); and

a monitoring circuit for monitoring the first and second temperature-dependant voltage signals and producing an output signal representative of the volume of fluid passing through the fluid transfer apparatus ('024; fig. 1, U1-U4).

wherein the monitoring circuit includes an instrumentation amplifier for producing the output signal, wherein the instrumentation amplifier includes: a first input terminal for receiving the first temperature-dependant voltage signal; and a second input terminal for receiving the second temperature-dependant voltage signal ('063, fig. 1, U1-U4).

However McCulloch does not disclose the use of filters, calibration devices, or shunt resistors.

The claims further recite, as disclosed by Horowitz and Hill:

wherein the monitoring circuit includes a low-pass filter circuit, coupled to the instrumentation amplifier, for filtering the output signal (Horowitz and Hill, page 242-245 and figure 4.80).

wherein the low-pass filter circuit is a second-order-tow pass fiber circuit configured to have a three-decibel breakpoint of approximately 150 Hertz (Horowitz and Hill, page 423 and 242-245 and figure 4.80).

wherein the monitoring circuit includes a zero calibration device for applying a calibration voltage signal to the first and second input terminals of the instrumentation amplifier (Horowitz and Hill, fig. 7.27, "zero").

wherein the monitoring circuit includes:

a first shunt resistor for coupling the monitoring circuit to the first temperature-sensitive resistive device (Horowitz and Hill, fig. 7.27, R1); and

a second shunt resistor for coupling the monitoring circuit to the second temperature-sensitive resistive device (Horowitz and Hill, fig. 7.27, R3).

Thus, it would have been obvious to one of ordinary skill in the art to use the amplifier with filter of Horowitz and Hill with the invention of McCulloch to ensure high frequency stability of the circuit (see Horowitz and Hill, page 245) in an amplifier with increased common mode input range (see Horowitz and Hill, page 423).

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hooper in view of U.S. Patent 6,450,024 to McCulloch et al in view of U.S. Patent 6,023,969 to Feller.

The claims recite, as disclosed by McCulloch:

a first temperature-sensitive resistive device, thermally coupled to a first portion of a fluid transfer apparatus, for producing a first temperature-dependant voltage signal representative of the temperature of the fluid within the first portion of the fluid transfer apparatus ('024; fig. 1, 16);

a first current control device, coupled to the first temperature-sensitive resistive device, for controlling a first current signal flowing through the first temperature-sensitive resistive device ('024; fig. 1, 14);

a second temperature-sensitive resistive device, thermally coupled to a second portion of the fluid transfer apparatus, for producing a second temperature-dependant voltage signal representative of the temperature of the fluid within the second portion of the fluid transfer apparatus ('024; fig. 1, 18);

a second current control device, coupled to the second temperature-sensitive resistive device, for controlling a second current signal flowing through the second temperature-sensitive resistive device ('024; fig. 1, 12); and

a monitoring circuit for monitoring the first and second temperature-dependant voltage signals and producing an output signal representative of the volume of fluid passing through the fluid transfer apparatus ('024; fig. 1, U1-U4).

wherein the transfer apparatus is a tube ('024, col. 4, line 30).

However, McCulloch does not disclose a bypass tube.

The claims further recite mounting the sensor in a bypass tube, as disclosed by Feller ('969, col. 5, line 21).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the sensor of McCulloch in the bypass tube of Feller to protect the sensor from damage (see '969, col. 5, line 28).

Allowable Subject Matter

Claims 9-10, 17-18, and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 9-10 and 35 recite, "a resistive calibration device, coupled to the first and second control resistive devices, for adjusting the resistive values associated with the first and second control resistive devices". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 17-18 recite, "wherein the zero calibration device includes a digital switch for temporally connecting the first and second input terminals of the instrumentation amplifier". This feature in combination with the remaining claimed structure avoids the prior art of record.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Cherry whose telephone number is (571) 272-2272. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SJC

MICHAEL NGHIEM
PRIMARY EXAMINER